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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF	:
YUUKI TAUCHI, ET AL.	: EXAMINER: MORILLO, J.C.
SERIAL NO: 10/633,550	:
FILED: AUGUST 5, 2003	: GROUP ART UNIT: 1742
FOR: AG BASE ALLOY THIN FILM AND SPUTTERING TARGET FOR FORMING AG BASE ALLOY THIN FILM	:

DECLARATION UNDER 37 C.F.R. §1.132

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

Now comes Yuuki TAUCHI who deposes and states that:

1. I have a masters of engineering degree, which was conferred upon me in 2001 by Tsukuba University located in Ibaraki, Japan.

2. I have been employed by Kobe Steel, Ltd. since 2001 and been seconded to Kobelco Research Institute, Inc., which is a wholly-owned subsidiary company of Kobe Steel, Ltd, for recent 2 years , and I have a total of 7 years of work and research experience in the field of thin film material (for optical disk).

3. I understand the English language or, at least, the contents of this Declaration were made clear to me prior to executing the same.

4. The following experiments were carried out by me or under my direct supervision and control.

5. The following is description of the experiments performed herein and the importance of the same.

Ag-Bi alloys have higher thermal conductivity/higher reflectivity/higher durability, and high thermal conductivity. These characteristics are required for high speed recording optical disc. However, as described in the specification of this application, these characteristics are not produced when the addition amount of Bi is greater than 0.4 atomic percent. Changes in thermal conductivity of film by adding Bi is described on table in examples provided in this Declaration below.

On recording optical disc, e.g., DVD-R, a recording mark is formed by heat caused by an irradiating laser beam into recording layer (dye). High thermal conductivity is required for the reflective layer adjacent to the recording layer for high speed recording because it is necessary to diffuse heat rapidly to form the recording mark in shorter time. When using low thermal conductivity material for reflective layer, a recording mark would be influenced by heat arising by forming the former mark and the appropriate recording mark would not be formed. As a result, the PI error which is a symbol value for error signal would be worse.

6. The following Example was performed:

6-1. Preparation

A dye layer for DVD+R as recording layer was coated by a spin-coating process, using a DVD bonding machine (NEC engineering Co., Ltd.), on a 0.6mm thickness polycarbonate substrate having grooves as specified in DVD+R specification and annealed for drying. Subsequently, a Ag-Bi reflective layer was laminated by a sputtering process using a Unaxis Cube-star. The sputtering power was set at 2kW, and sputtering time was set at about 4 seconds as film thickness should be 140nm. DVD+R disks having 1.2mm

thickness were obtained with bonding 0.6mm thickness polycarbonate substrate by DVD bonding machine with UV resin.

6-2 Evaluation

6-2-1 Bi content in film

Samples for Bi content analysis were prepared by sputtering under the same conditions for making reflective layer in DVD+R disks described above when using a polycarbonate substrate. Bi content was analyzed by ICP (inter-coupled-plasma) spectroscopy and ICP mass method.

6-2-2 Electric signal property

NEC ND-2510A was used for recording on DVD+R disks. Each disk is recorded by 8X.Modulation and the PI error was evaluated by AudioDev DVD-CATS and Pulstec DDU-1000.

7. The following results were obtained:

Table 1 shows modulation and PI of manufactured disks.

Bi content in reflective layer [%]	Modulation [ratio]	PIE [count]	Electric property
0.08	0.66	143	GOOD
0.35	0.60	146	GOOD
0.52	0.49	469	NO GOOD
0.69	0.52	1159	NO GOOD

Modulation should be 0.6 or more was established by Standard so that data of Modulation of 0.6 or more was evaluated as GOOD. PI error (PI sum 8) should be 280 or less was

established by Standard so that data of PT error of 280 or less was evaluated as GOOD. Modulation becomes 0.6 or less and PI error becomes 280 or more when Bi content is more than 0.4 at %. Accordingly, it is proper that Bi contents of film should be 0.4 at% or less when the film will be used as reflective layer of DVD+R Disk.

8. As illustrated by the foregoing example, the upper limit of Bi content in silver alloy reflective film for optical disk is set at 0.4 atomic percent. This upper limit is set due to observed decreases in modulation of recorded signal and increasing error signal in terms of decreasing thermal conductivity when the reflective film has more than 0.4% addition of Bi.

9. I declare further that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

10. Further Declarant saith not

田内裕基

Name: Yuuki TAUCHI
Kobe Steel, Ltd.

05/02/2008

Date